

CLAIMS

What is claimed is:

1. A method for communication of data between a transmitter and a receiver over one or more communication channels, the data being provided in a frame, the method comprising the steps of:
5 (1) at the transmitter:
 (a) dividing the frame into segments according to an optimum segment size;
 (b) combining multiple segments into a segment block;
 (c) applying a forward error correction encoding process to the segment block to produce a forward error correction block;
 (d) sending the forward error correction block over a communication channel;
10 (e) applying a forward error correction decoding process on the forward error correction block to produce a received block;
 (f) dividing the received block into segments;
 (g) determining if any segment was received in error; and
 (h) requesting retransmission only of the segment received in error.
20 2. A method as in claim 1 additionally comprising the step of, at the transmitter:
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- (i) inserting a checksum into the segments to enable identification of erroneously received segments at the receiver.
3. A method as in claim 1 wherein step (b) additionally comprises the step of, at the transmitter:
- 5 (j) inserting a position number into the segments to identify a position of the segment within the frame.
4. A method as in claim 1 wherein step (d) additionally comprises sending the forward error correction block over multiple distinct communication channels.
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5. A method as in claim 1 additionally comprising the steps of, at the receiver:
- 15 (k) determining the number of segments received at the receiver in error; and
- (l) determining the optimum segment size for the communication channel based upon the determined number of segments received in error which were attempted to be communicated over that channel.
- 20 6. A method as in claim 5 wherein steps (k) and (l) additionally comprise determining an error rate in each channel and an optimum number of segments for each channel individually.
7. A method as in claim 5 wherein step (k) determines the number of segments received in error at the receiver
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by counting the number of selective reject orders made to the transmitter.

8. A method as in claim 1 wherein step (k) determines an optimum number of frames according to a ratio of a number of segments received in error to a number of segments received correctly.
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9. A method as in claim 1 wherein step (k) additionally comprises the step of determining an adjusted number of data bytes in a frame, X, from the formula:

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$$X = -H + \sqrt{(X_{current} + H_{current}) * H / R}$$

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where $X_{current}$ is the present number of data bytes in a frame, $H_{current}$ is the present frame overhead in bytes,, H is the new overhead for the frame in bytes, and R is a ratio of segments received in error to segments received correctly.

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10. A method for providing wireless communication of digital signals, the digital signals being communicated between a plurality of wireless subscriber units and a base station, the digital signals being communicated using at least one radio frequency channel via Code Division Multiple Access (CDMA) modulated radio signals, the digital signals also having a given nominal data rate, the method comprising the steps of:

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- (a) making available a plurality of sub-channels within each CDMA radio channel, wherein a data rate of each sub-channel is less than the nominal data rate of the digital signals;
 - 5 (b) establishing a network layer session between terminal equipment connected to the subscriber unit through the base station to other terminal equipment connected to the base station; and
 - (c) during the network layer session, allocating available sub-channels on an as-needed basis, with the number of sub-channels allocated thereby changing during the duration of a given session;
 - 10 (d) dividing a network layer frame into segments according to optimum segment sizes;
 - (e) combining multiple segments into a segment block;
 - 15 (f) applying a forward error correction encoding process to the segment block to produce a forward error correction block;
 - (g) at a receiver, decoding the forward error correction block and divides it back into segments; and
 - 20 (h) requesting retransmission only of a segment received in error.
11. A method as in claim 10 additionally comprising the step of:
- 25 (i) determining an optimum segment size for the sub-channels based upon a determined number of segments received in error which were attempted to be communicated over the sub-channels.

12. A method as in claim 10 wherein step (i) additionally comprises dynamically adjusting the frame size of a channel to optimize the effective throughput of the overall system based upon the ratio of actual data transferred to the number of bits actually used to carry information, including frame overhead and retransmissions.

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